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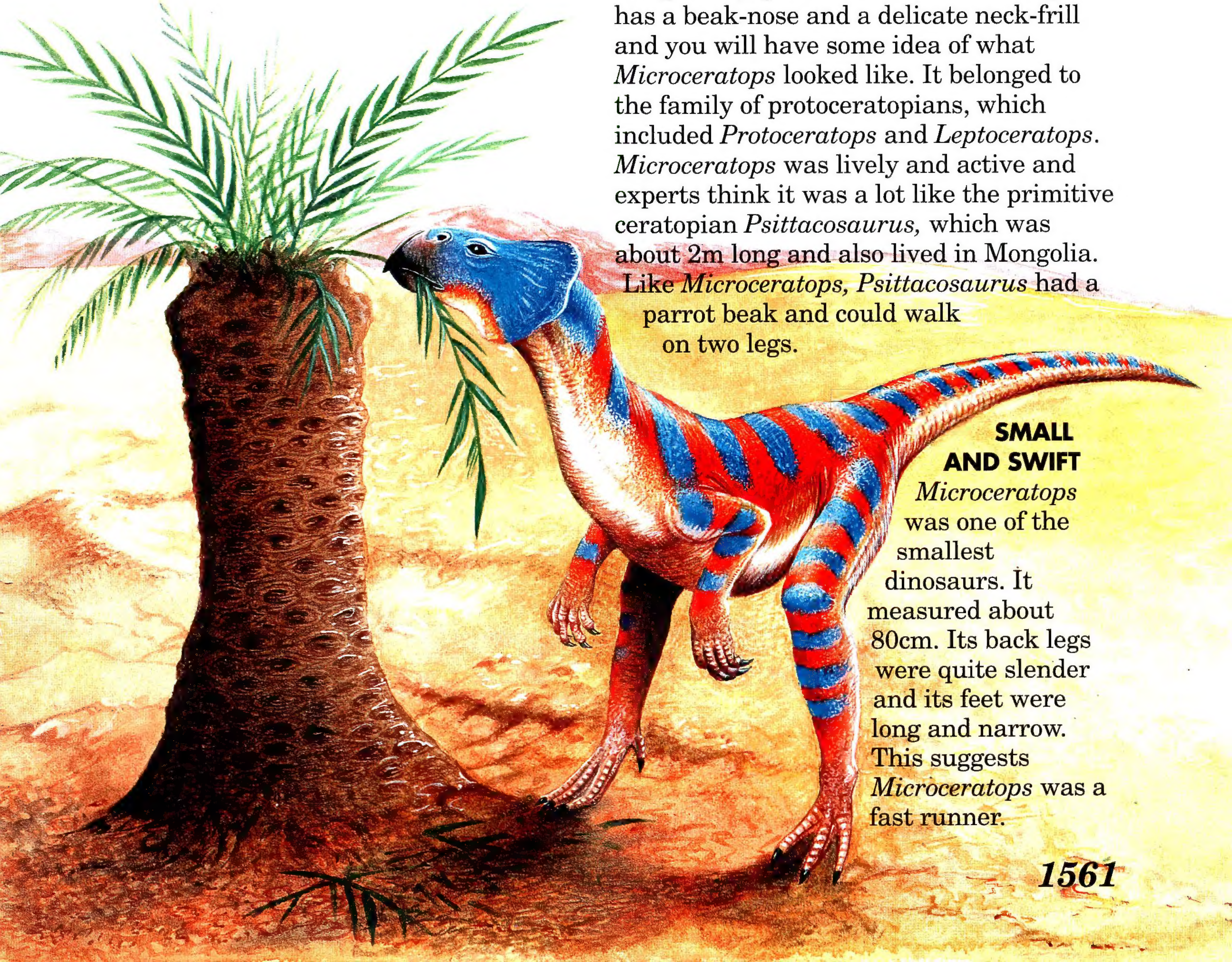
MICROCERATOPS

Tiny *Microceratops* lived among terrifying predators such as *Tarbosaurus* and *Velociraptor*.

The bare, arid earth of modern Mongolia is a treasure trove for fossil hunters. In prehistoric times Mongolia must have teemed with animal life.



NIPPING AROUND

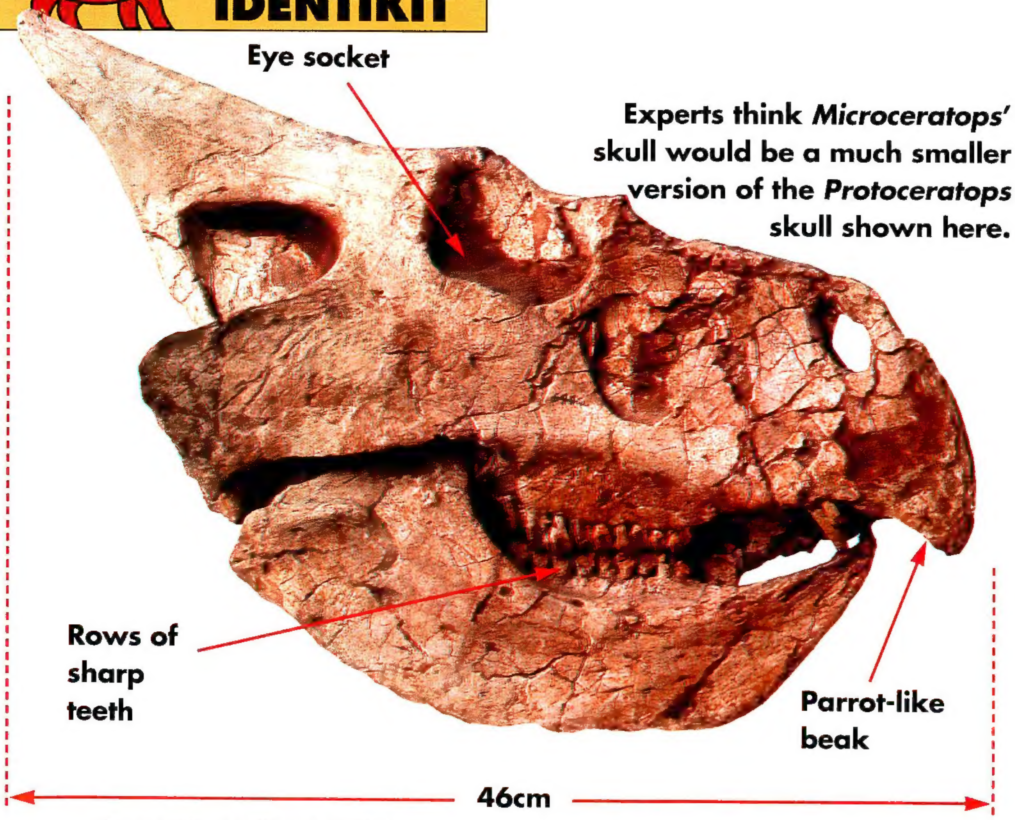
Fossils discovered in Mongolia show that a great variety of dinosaurs lived there over 70 million years ago. Huge carnivores and egg-eaters lived alongside gentle plant-eaters and herds of bonehead dinosaurs. Nipping around the feet of its large neighbours was little *Microceratops*.

FAMILY MATTERS

Imagine a piglet that walks on two legs, has a beak-nose and a delicate neck-frill and you will have some idea of what *Microceratops* looked like. It belonged to the family of protoceratopians, which included *Protoceratops* and *Leptoceratops*. *Microceratops* was lively and active and experts think it was a lot like the primitive ceratopian *Psittacosaurus,* which was about 2m long and also lived in Mongolia. Like *Microceratops, Psittacosaurus* had a parrot beak and could walk on two legs.

SMALL AND SWIFT

Microceratops was one of the smallest dinosaurs. It measured about 80cm. Its back legs were quite slender and its feet were long and narrow. This suggests *Microceratops* was a fast runner.



Experts think *Microceratops'* skull would be a much smaller version of the *Protoceratops* skull shown here.

BEAKS AND TEETH

Like its relatives, *Microceratops* probably nipped off shoots with the hard edge of its horny beak. With the teeth in its cheeks, it sliced up food with a scissor-like action. When *Microceratops* balanced on its back legs, its forearms could grasp stems above its head and pull them down to its mouth.

HAPPY TO SHARE

It did not need the same quantities of food as big plant-eaters and was probably happy to share its juicy supper with larger plant-eaters such as *Homalocephale*.

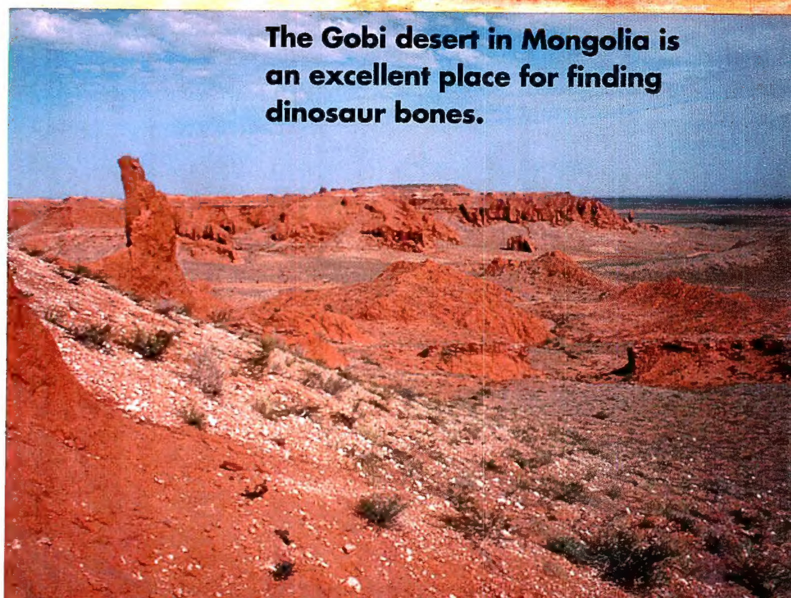
IT'S A FACT

AMERICAN DISCOVERY

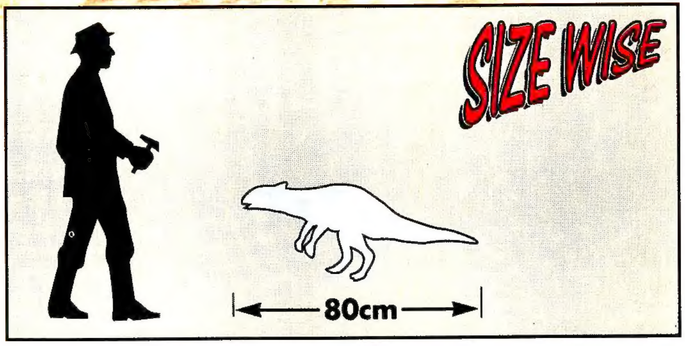
It was an American team of scientists that first discovered the rich fossil resources of Mongolia. A team led by Roy Chapman Andrews and Walter Granger made the first expedition in 1922.

FRILLED TO SEE YOU

Microceratops has a short, solid frill at the back of its skull. Muscles attached to the frill probably helped move the powerful jaws. A frill also helped a dinosaur to recognise members of its herd.



The Gobi desert in Mongolia is an excellent place for finding dinosaur bones.



LIFE ON THE RUN

Life was full of danger for *Microceratops*. Larger predators such as *Velociraptor* were always ready to pounce, and egg-stealing *Oviraptor* hovered hopefully around its nests. Living in a herd gave *Microceratops* some protection. Alerted to a sound, the group could run through the undergrowth to safety. The youngest or the slowest dinosaurs were most likely to be caught.

MONSTER FACTS

- **NAME:** *Microceratops* (my-crow-serra-tops) means 'tiny horned face'
- **GROUP:** dinosaur
- **SIZE:** 80cm long
- **FOOD:** plants
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in Mongolia and China

DEINOCHEIRUS

Two gigantic arms are the only fossils of *Deinocheirus* found so far.

On a wet day in southern Mongolia, Polish scientists were amazed to find some huge bones sticking out from the top of a small hill. They were part of the shoulder, arms and claws of a mysterious dinosaur.

THE LONG ARM

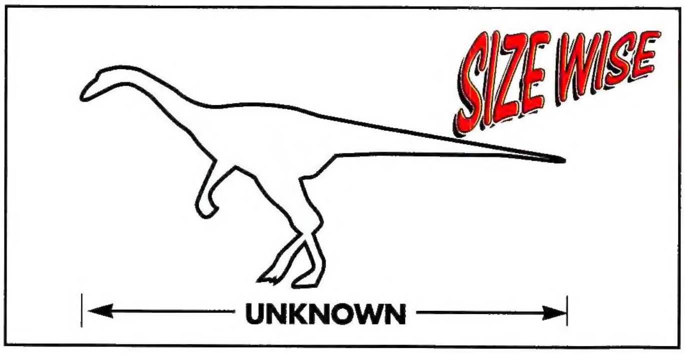
This extraordinary find puzzled all the experts. Long, slender limbs and three-fingered hands were a feature of the ostrich dinosaurs, the ornithomimosaurs. But, at 2.4m long, this arm was bigger than any ornithomimosaur arm palaeontologists had ever found.

FINGERS AND THUMBS

The experts found that none of the *Deinocheirus*' fingers could fold inwards to grasp objects.

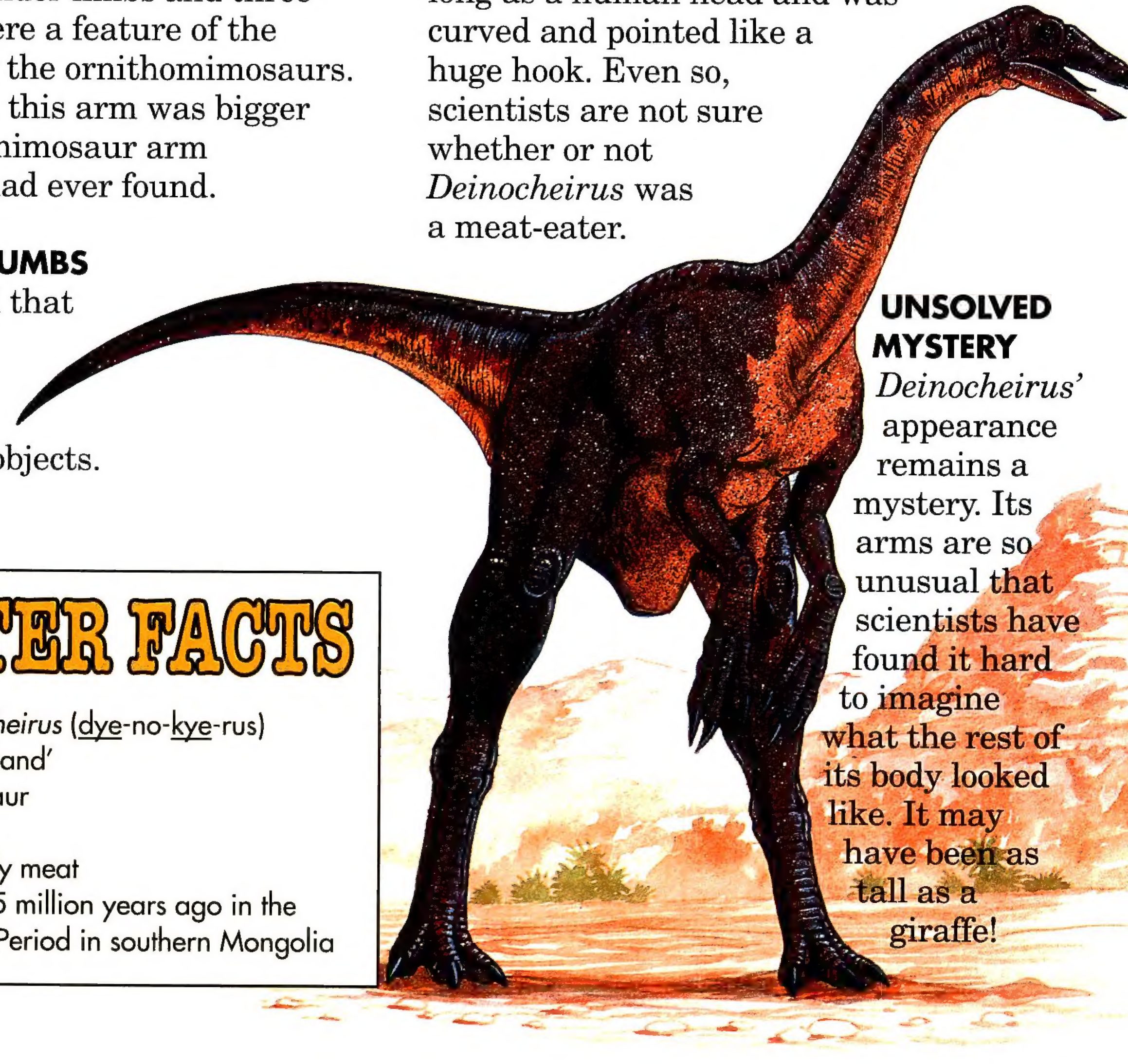
MONSTER FACTS

- **NAME:** *Deinocheirus* (dye-no-kye-rus) means 'terrible hand'
- **GROUP:** dinosaur
- **SIZE:** unknown
- **FOOD:** probably meat
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in southern Mongolia



GIANT CLAWS

Deinocheirus could not grip tightly, but it could do immense damage with its enormous claws. Each claw was as long as a human head and was curved and pointed like a huge hook. Even so, scientists are not sure whether or not *Deinocheirus* was a meat-eater.



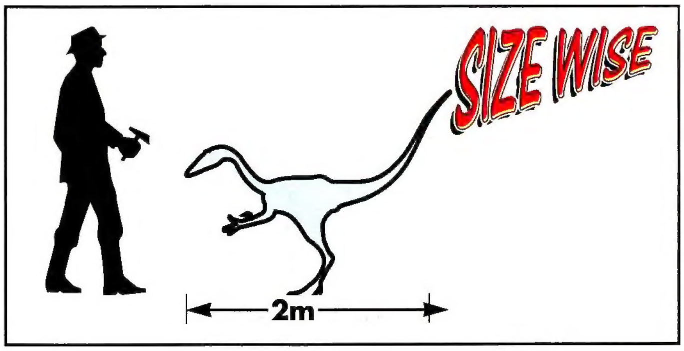
UNSOLVED MYSTERY

Deinocheirus' appearance remains a mystery. Its arms are so unusual that scientists have found it hard to imagine what the rest of its body looked like. It may have been as tall as a giraffe!

BOROGOVIA

Borogovia was a nimble hunter of small mammals.

Borogovia was a two-legged predator about 2m long. It moved stealthily through the forest. If a small creature scurried through the undergrowth, *Borogovia* was alerted instantly. It had forward-facing eyes to help it see tiny shapes, even when the light was fading.

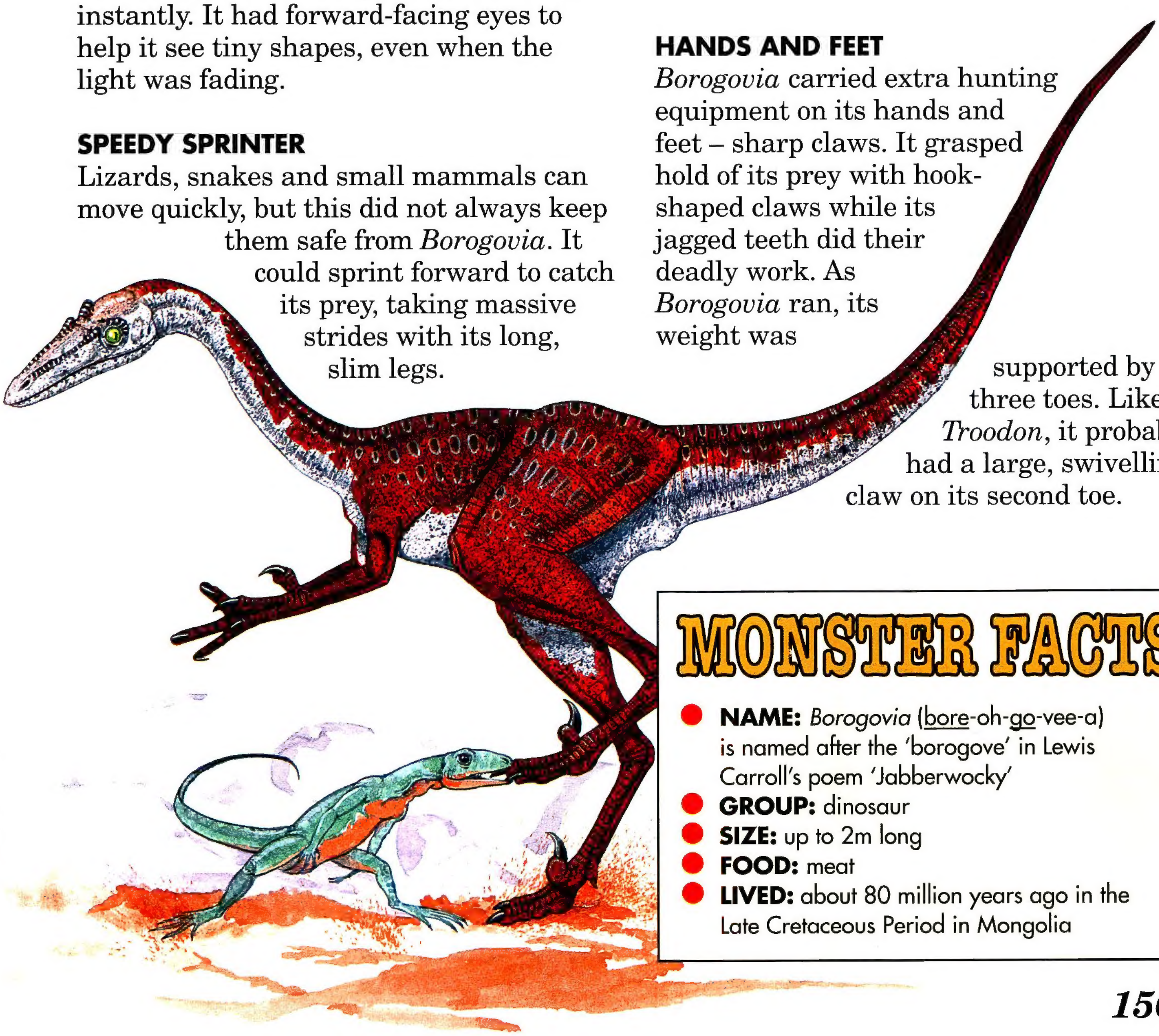


SPEEDY SPRINTER

Lizards, snakes and small mammals can move quickly, but this did not always keep them safe from *Borogovia*. It could sprint forward to catch its prey, taking massive strides with its long, slim legs.

HANDS AND FEET

Borogovia carried extra hunting equipment on its hands and feet – sharp claws. It grasped hold of its prey with hook-shaped claws while its jagged teeth did their deadly work. As *Borogovia* ran, its weight was supported by three toes. Like *Troodon*, it probably had a large, swivelling claw on its second toe.



MONSTER FACTS

- **NAME:** *Borogovia* (bore-oh-go-vee-a) is named after the 'borogove' in Lewis Carroll's poem 'Jabberwocky'
- **GROUP:** dinosaur
- **SIZE:** up to 2m long
- **FOOD:** meat
- **LIVED:** about 80 million years ago in the Late Cretaceous Period in Mongolia

Galloping wonders

Horses have evolved from tiny leaf-eaters to the superb athletes of today over a period of 50 million years.

Horses are marvellous. They can be trained to obey commands, can run like the wind, carry riders, leap over fences, prance elegantly to music, and pull a carriage or a cart.

THE HORSE FAMILY

All horses today, from tiny Shetland ponies to huge carthorses, belong to a single species, *Equus caballus*. There are six other horse-type animals, also named Equus, which make up the living members of the horse family, the equids (e-kwids).

Is it true that the zebra is a striped horse?

Yes. Or, more accurately, it's a striped equid. Zebras are extremely similar to horses, apart from the colour and pattern of their coat. In fact, the seven living members of the horse family are very close relatives and are all called Equus:

- Horse: *Equus caballus.*
- Wild Mongolian or Przewalski's horse: *Equus przewalski.*
- Plains zebra: *Equus burchelli.*
- Mountain zebra: *Equus zebra.*
- Grevy's zebra: *Equus grevyi.*
- Asian ass: *Equus hemionus.*
- African ass: *Equus africanus.*

A LONG HISTORY

Horses were probably first tamed and used by people over 6,000 years ago in Asia. But the story of the horse family begins over 50 million years ago, during the Early Eocene Epoch, when equids first appeared. At this time, horses were dog-sized, forest-dwelling, leaf-eaters. When grasses appeared and spread across the lands, horses evolved to take advantage of this new food source. There were many equid species in prehistoric times, especially in North America.

FOUR KEY CHANGES

Horses have evolved in four main ways. All the factors have contributed to make today's horses very fast.

Bigger: horses got bigger, and so stronger and better able to defend themselves.

Longer: horses' legs got longer, so they could move further, faster.

Slimmer: legs became slimmer, too, which saved weight and helped agility.

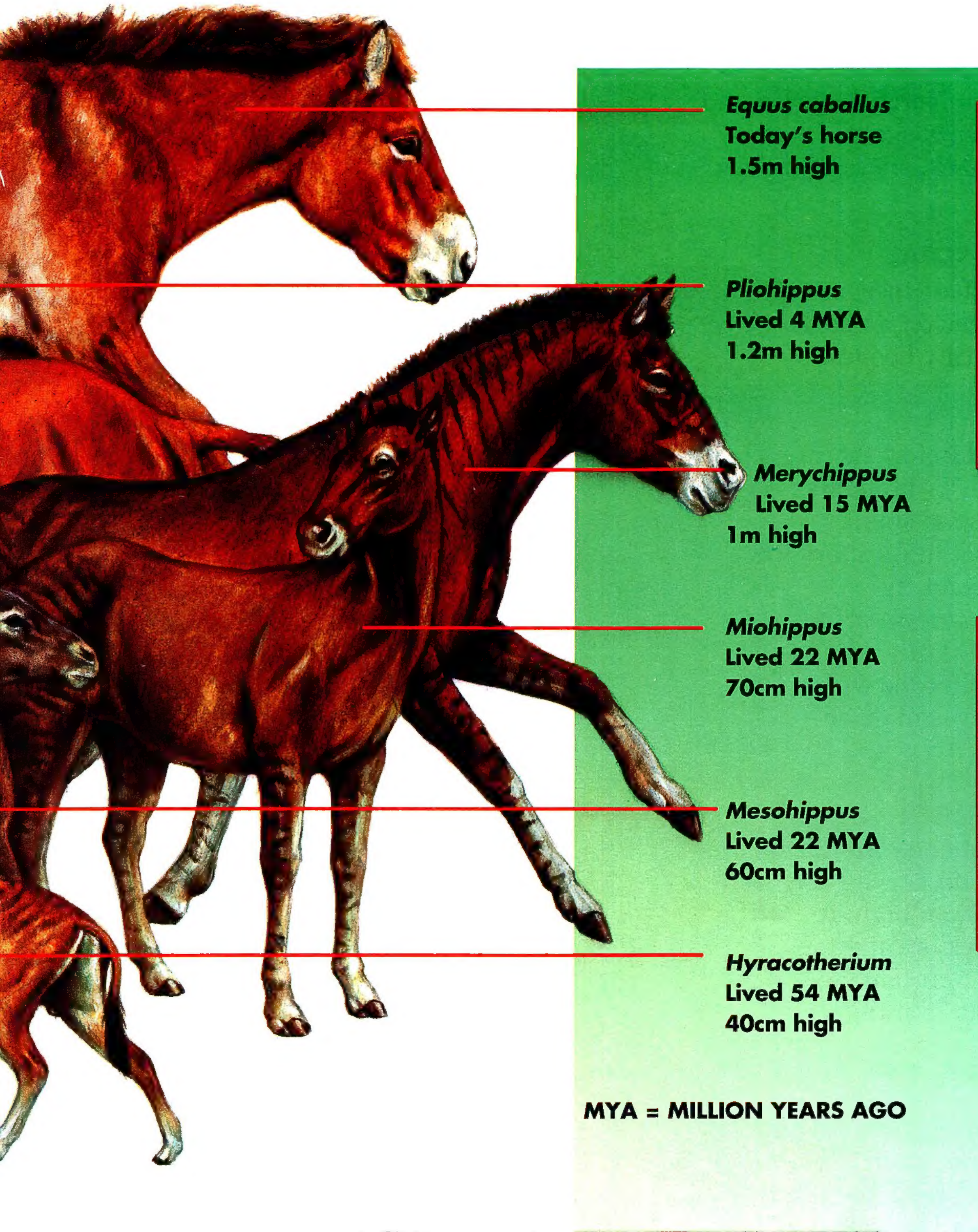
Fewer: the toes were reduced to one.

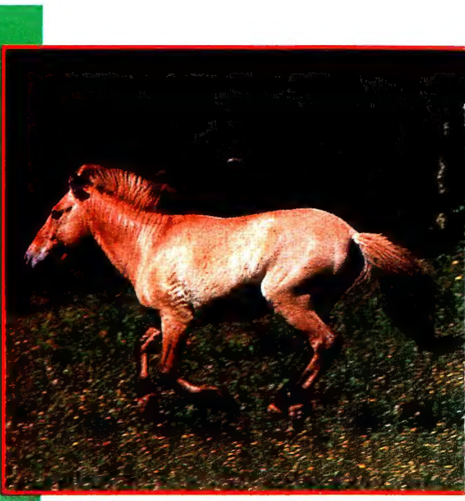
FIT FOR THE JOB

Their necks became long and well muscled to cope with grazing on the open grasslands. Their jawbones became long and deep to carry large, hard-wearing teeth, excellent for chewing tough grass.

SUPER SENSES

Horses evolved into alert animals with sharp eyesight, keen hearing, a good sense of smell and a fairly large brain.





Today's horse can gallop at up to 60kph.

For 6,000 years, man has used horse power.

Is it true that the horse stands on its toenails?

Yes. The hoof of a horse is equivalent to a cat's claws or your fingernails. All three are made of the same stuff, keratin, which is hard and tough, yet light. The hoof is like a wrap-around toenail. The modern horse has only the third toe on each foot, so you could say that it stands on four third toenails.

FIRST HORSE

Hyracotherium, the first horse, was only 40cm high. It lived in North America and Europe 54 million years ago and had a short neck, curved back, short, slim legs and a long tail.

FOURTEEN TOES IN TOTAL

Hyracotherium had four toes on its front feet and three on its back feet, each tipped by tiny hooves.

LIVING IN FORESTS

Hyracotherium lived in forests in the low undergrowth. It probably ate soft leaves, using its small, low-crowned teeth set in its short jaws. *Orohippus* was a tiny descendant of *Hyracotherium* that lived in the Eocene Epoch. It had bigger teeth and could cope with chewing tougher leaves in drier woodland.

TALLER AND STRAIGHTER

Mesohippus, which means 'middle horse', was larger than *Hyracotherium*, at 60cm high. It also had a longer neck, straighter back and larger teeth. It lived in North America about 38 million years ago. It had three hoof-tipped toes on each long leg.

TOWARDS THE SINGLE TOE

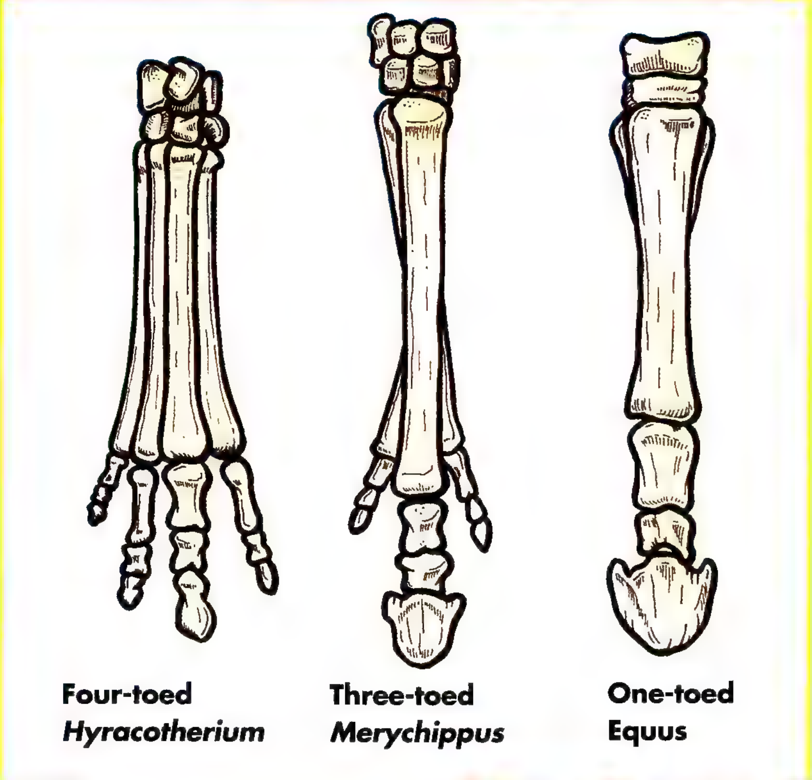
Living about 22 million years ago, *Miohippus* was bigger still. Its feet were beginning to take on the appearance of today's horse's hoof. On each foot there were three toes, but the middle one was larger and longer than those on either side. *Miohippus*' cheek teeth were large and ridged, which helped it chew the tough plants that grew in the dry climate.

GRASSLAND GRAZERS

Grasses first evolved during the Miocene Epoch, and spread across the landscape in the dry climate. *Merychippus*, from North America 15 million years ago, was one of the first grass-eating or grazing horses and had long, ridged cheek teeth that kept on growing as they wore down.

ALMOST THERE

Merychippus was 1m tall and had one main hoof on each foot. *Pliohippus* was 1.2m tall and looked like today's horse. It had lost its outer toes. It lived in the Pliocene Epoch about 4 million years ago.



A Suffolk Punch (right) is given some new shoes to give its hoofs a longer lease of life.

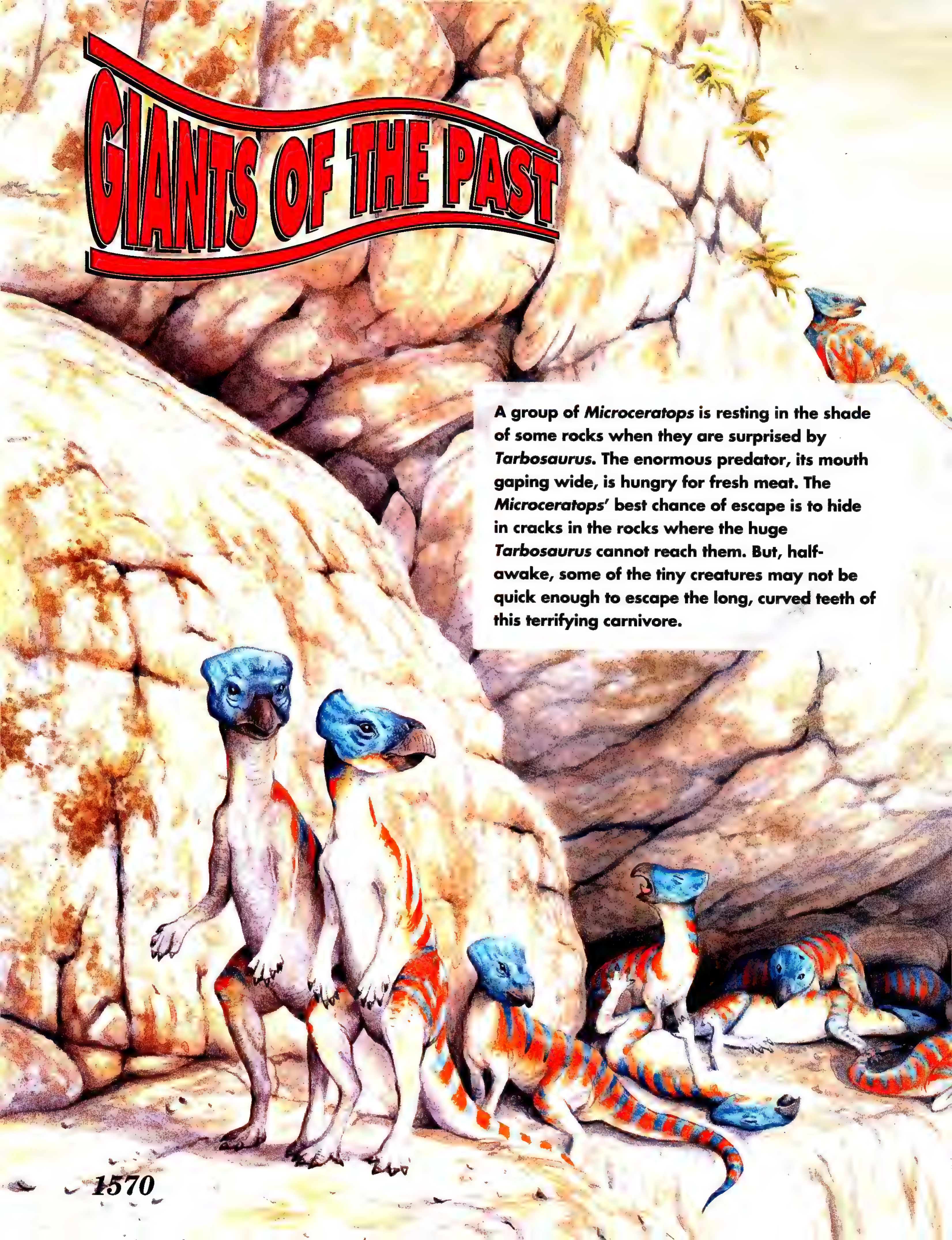
A herd of *Pliohippus* (left) gathers by the river to drink.

A herd of grazing *Mesohippus* (inset).

HORSES TODAY

The species of horse we know today first appeared around two million years ago. It spread worldwide, although horses died out in North America until Spanish invaders introduced some in the 16th century. By the end of the Pleistocene Ice Ages, there were only a few Equus species, in Asia and Africa. Later, humans tamed the horse and took it all over the world.

GIANTS OF THE PAST

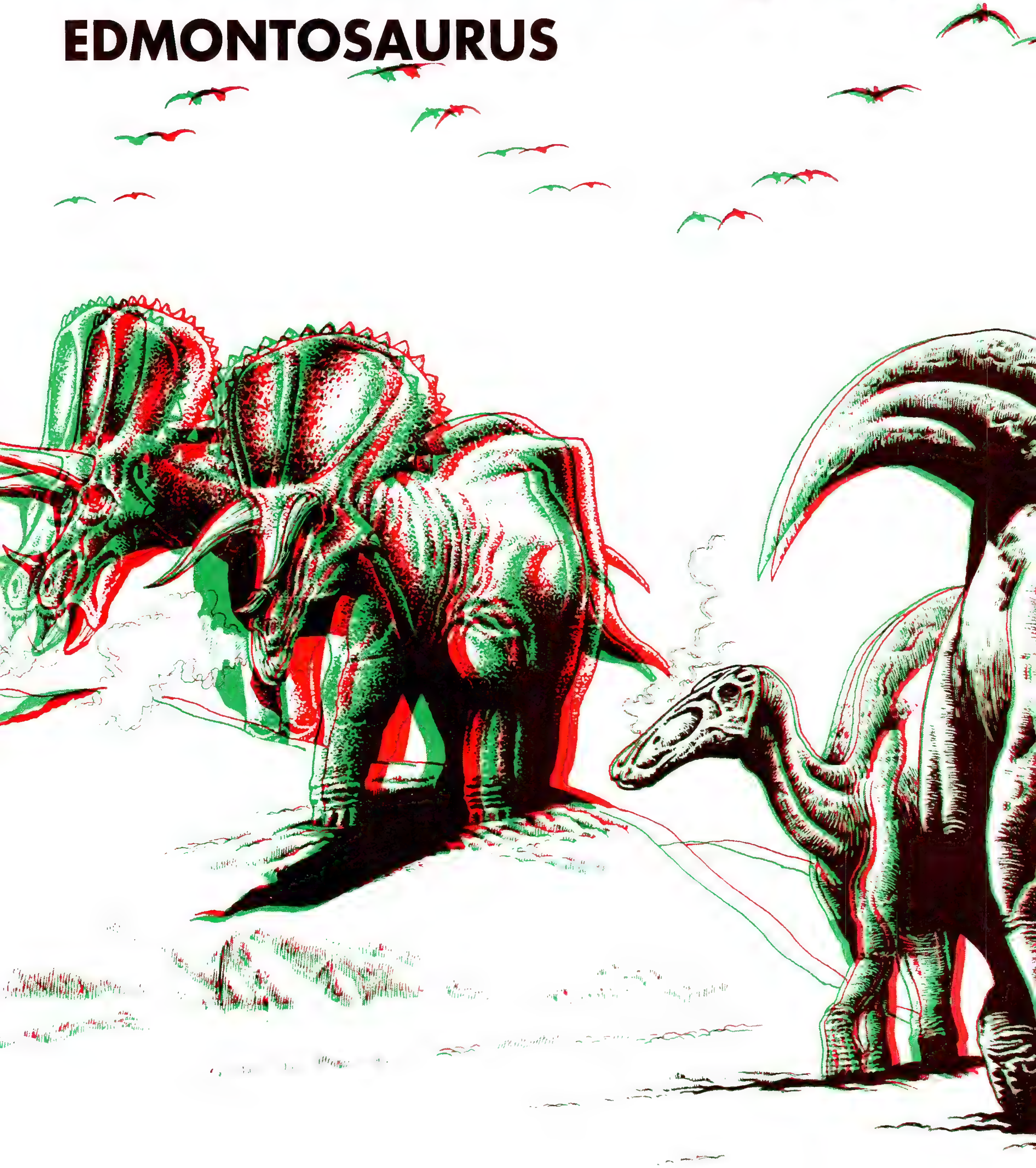


A group of *Microceratops* is resting in the shade of some rocks when they are surprised by *Tarbosaurus*. The enormous predator, its mouth gaping wide, is hungry for fresh meat. The *Microceratops'* best chance of escape is to hide in cracks in the rocks where the huge *Tarbosaurus* cannot reach them. But, half-awake, some of the tiny creatures may not be quick enough to escape the long, curved teeth of this terrifying carnivore.

MICROCERATOPS

3-D Gallery 75

EDMONTOSAURUS



Late in leaving their Arctic summer grazing grounds, a herd of *Edmontosaurus* is caught in the first snows of winter. These herbivores need vast amounts of food to survive and must hurry to reach warmer pastures. Two *Triceratops* are also fleeing south to escape the cold weather.

Dragons and griffins

Were dinosaurs the inspiration for mythical monsters and beasts?

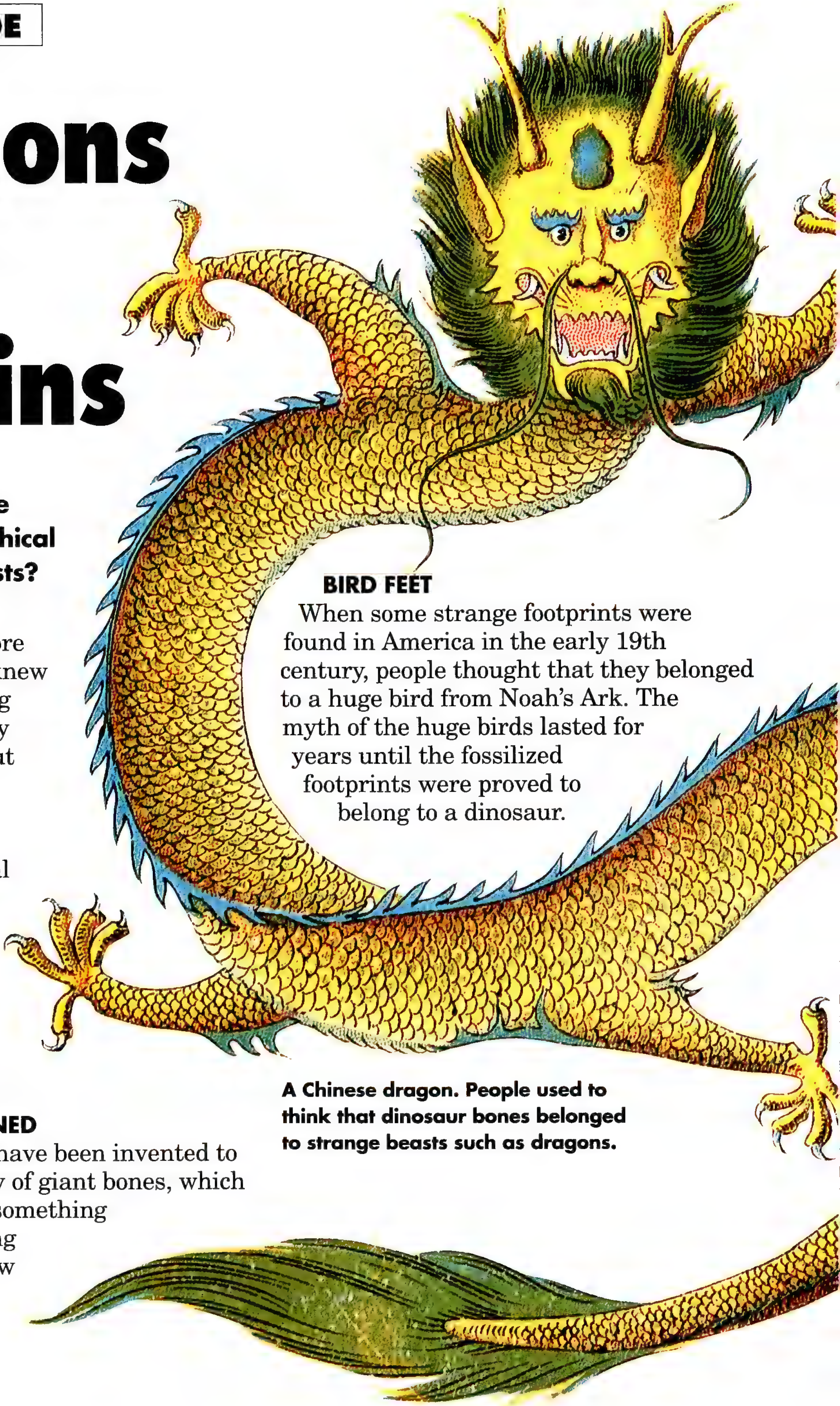
Long before people knew anything about dinosaurs, they made up stories about amazing monsters.

FRIEND OR FOE?

Dragons are mythical animals. In the West they are terrifying creatures that breathe fire. In the East, the dragon brings good luck.

A MYSTERY EXPLAINED

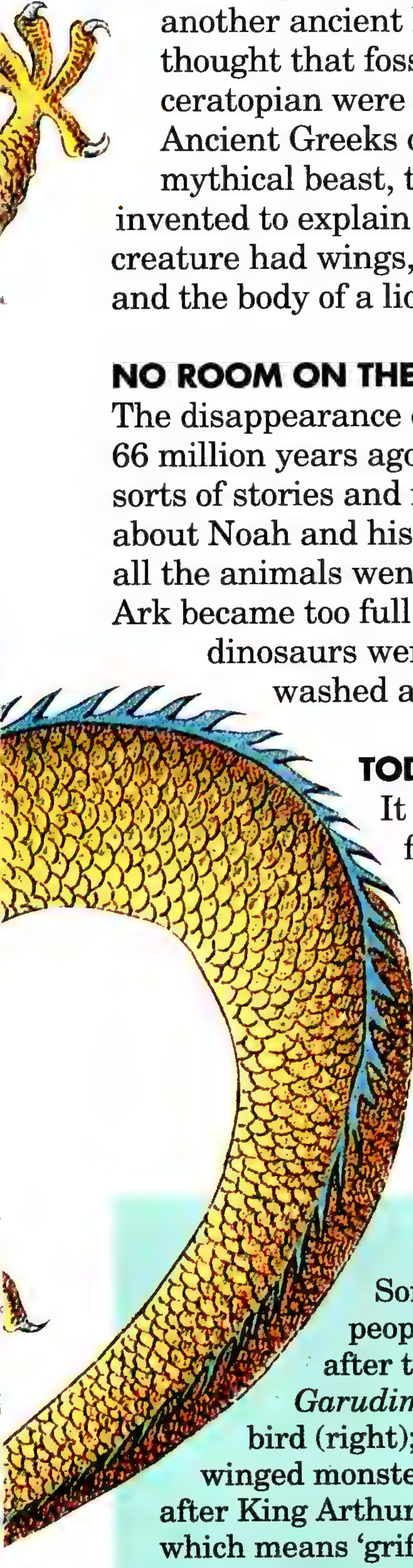
Dragon stories may have been invented to explain the discovery of giant bones, which clearly belonged to something bigger than any living animal. We now know these huge bones belonged to dinosaurs.



BIRD FEET

When some strange footprints were found in America in the early 19th century, people thought that they belonged to a huge bird from Noah's Ark. The myth of the huge birds lasted for years until the fossilized footprints were proved to belong to a dinosaur.

A Chinese dragon. People used to think that dinosaur bones belonged to strange beasts such as dragons.



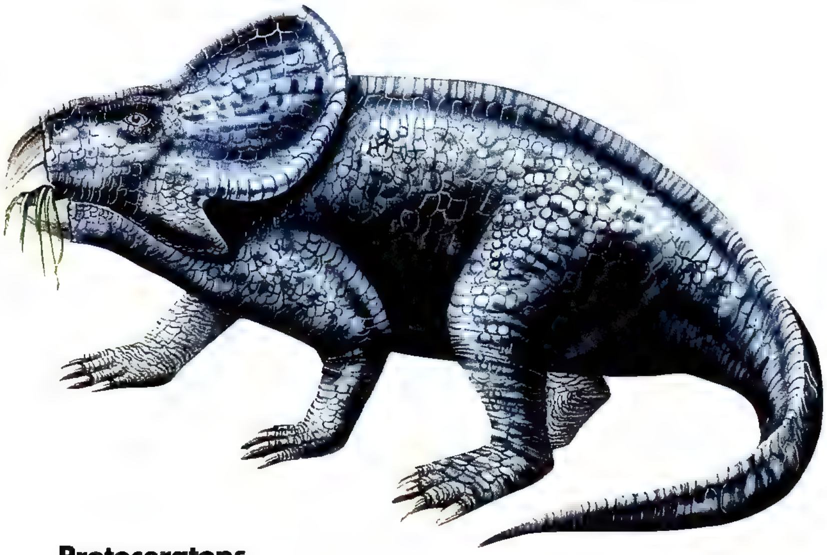
MISTAKEN IDENTITY

The gentle plant-eating dinosaur, *Protoceratops*, may have inspired another ancient legend. It is thought that fossils of this frilled ceratopian were found by the Ancient Greeks or Romans. The mythical beast, the griffin, was invented to explain them. This terrifying creature had wings, the head of an eagle and the body of a lion.

A mythical griffin

NO ROOM ON THE ARK

The disappearance of the dinosaurs 66 million years ago has given rise to all sorts of stories and myths. One of them is about Noah and his Ark. It is said that as all the animals went in two by two, the Ark became too full and the poor dinosaurs were left behind to be washed away by the flood!



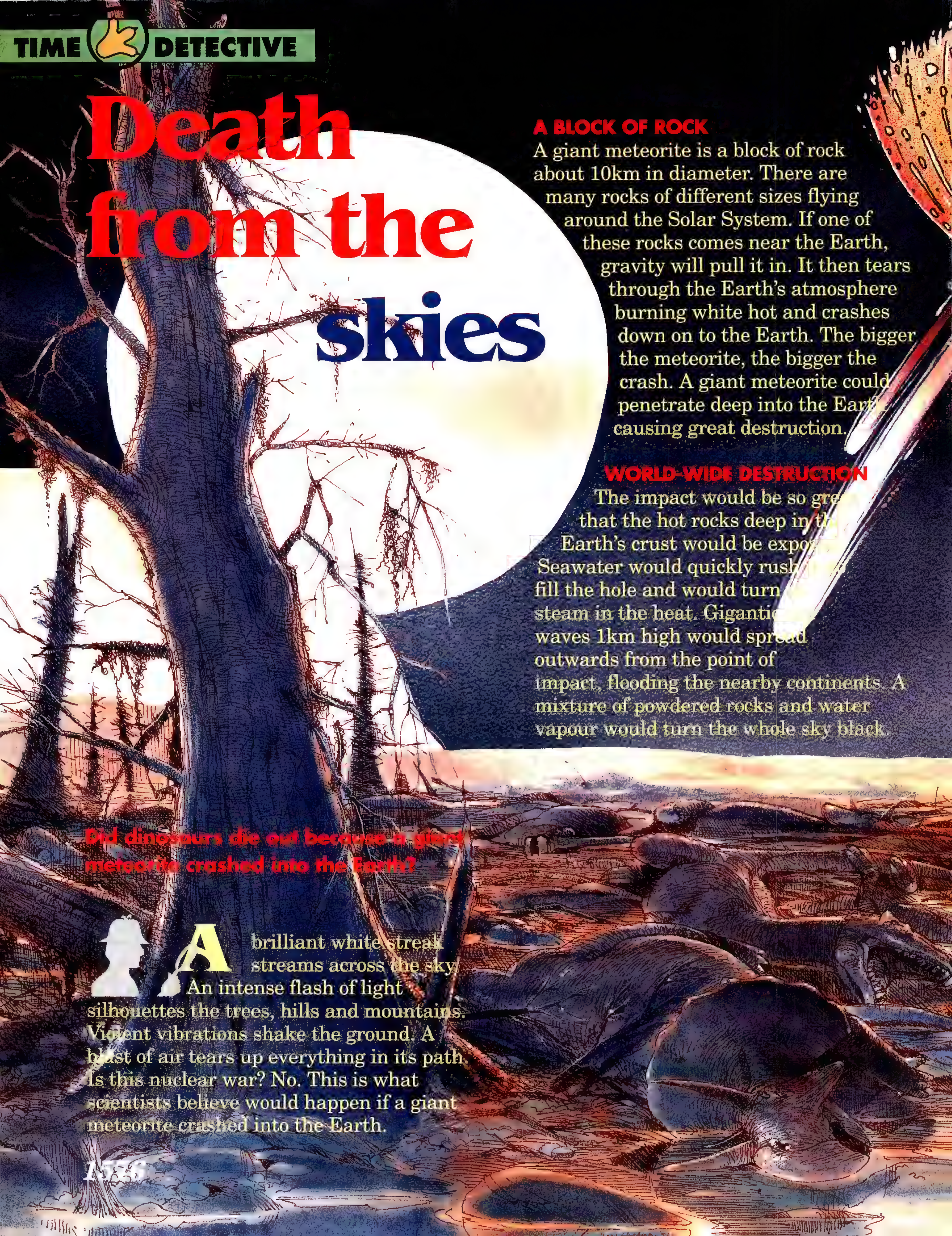
Protoceratops

TODAY'S DINO MYTHS

It is a myth that the flying reptiles, the pterosaurs, and the sea reptiles, the mososaurs, are dinosaurs. But many people go on calling them dinosaurs when they are not.

MYTHICAL NAMES

Some dinosaurs have been named after beasts and people in myths. These include: *Titanosaurus* – after the giant Titans in Greek myths; *Garudimimus* – after Garuda, a mythical Asian bird (right); *Harpymimus* – after the Harpy, a winged monster from Greek myth; *Camelotia* – after King Arthur's court at Camelot; *Gryposaurus* – which means 'griffin reptile'; *Rhoetosaurus* – after Rhoetos, a giant from Greek myth.



Death from the skies

Did dinosaurs die out because a giant meteorite crashed into the Earth?

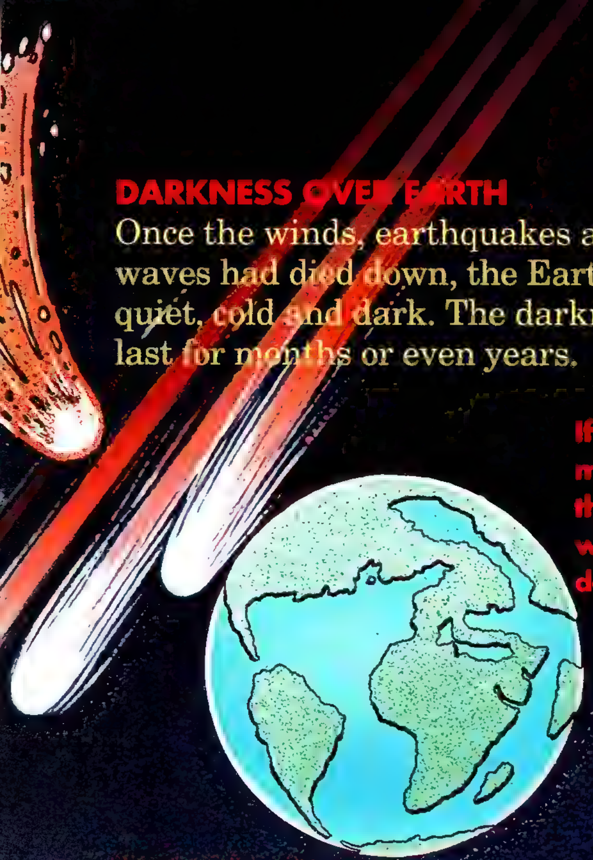
A brilliant white streak streams across the sky. An intense flash of light silhouettes the trees, hills and mountains. Violent vibrations shake the ground. A blast of air tears up everything in its path. Is this nuclear war? No. This is what scientists believe would happen if a giant meteorite crashed into the Earth.

A BLOCK OF ROCK

A giant meteorite is a block of rock about 10km in diameter. There are many rocks of different sizes flying around the Solar System. If one of these rocks comes near the Earth, gravity will pull it in. It then tears through the Earth's atmosphere burning white hot and crashes down on to the Earth. The bigger the meteorite, the bigger the crash. A giant meteorite could penetrate deep into the Eart causing great destruction.

WORLD-WIDE DESTRUCTION

The impact would be so gre that the hot rocks deep in th Earth's crust would be expo Seawater would quickly rush fill the hole and would turn steam in the heat. Gigantic waves 1km high would spread outwards from the point of impact, flooding the nearby continents. A mixture of powdered rocks and water vapour would turn the whole sky black.



If a giant meteorite hit the Earth it would be devastating.

DARKNESS OVER EARTH

Once the winds, earthquakes and giant waves had died down, the Earth would be quiet, cold and dark. The darkness could last for months or even years.

TWILIGHT OF THE DINOSAURS

What would have happened to the dinosaurs if a meteorite had crashed into the Earth? The first impact would have killed large numbers of animals. But most would have survived and continued with their day-to-day lives, confused by the cold and dark.

GOOD FOR MEAT-EATERS

The plant life would begin to die out in the dark and cold conditions. Eventually there would be nothing for the big plant-eating dinosaurs to eat and they would starve to death. The meat-eaters that survived the meteorite crash would have had lots of food at first. There would be the dinosaur corpses from the crash and the weak, starving plant-eaters would have been easy targets. But in time the food would have run out for the meat-eaters as well.

SUNLIGHT RETURNS

Eventually, after months or even years of darkness, the skies would begin to clear. A watery sun would shine down on the devastated landscape and life would slowly begin to return to the Earth. But by this time, the dinosaurs would have all died out.

What is? A METEORITE

A meteorite is a chunk of rock that falls to Earth from space. It begins life as a meteoroid. Most come from the band of asteroids around the Sun. Thousands of meteoroids enter the Earth's atmosphere every day, but most burn up before they crash into our planet. Meteorites are the ones that do not burn up and so reach the Earth.

Were these dinosaurs killed by a giant rock from outer space?

Scientists investigate a meteorite crater in the 1920s.

A TELL-TALE LAYER

Are we sure that all this actually happened? Not really, but there is plenty of evidence to suggest that it did. In the 1970s scientists found that the top layer of rock of the Cretaceous Period was rich in an element called iridium. Iridium is rare at the Earth's surface but quite common in meteorites. If a meteorite had struck the Earth at that time, it would have left a lot of iridium in the rocks.

These Cretaceous rocks contain a lot of an element called Iridium. Iridium is found in meteorites.

LOST ITS MARBLES

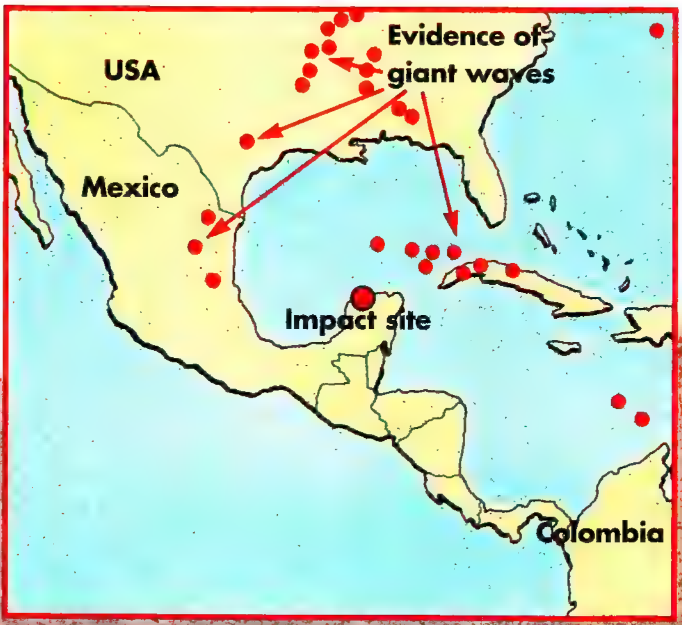
In these Cretaceous rocks, scientists have found a great many tektites. Tektites are tiny balls of glass, which are formed when splashes of molten rock cool down and become solid. Scientists believe they could have been produced when a meteorite blasted through the Earth's crust and reached the molten rock below.

CRACKED CRYSTALS

Crystals of the mineral called quartz are hard and tough. But the pieces of quartz found in the iridium-rich layer of rock are cracked and twisted. They have been subjected to a tremendous force – something like a vast explosion.

BUT WHERE IS THE HOLE?

If a massive meteorite struck the Earth, then it must have left some sort of a scar. Scientists have found a crater that is big enough and of the right age on the coast of the Yucatan Peninsula in Mexico. It is tens of kilometres in diameter. It is now buried, but scientists know it is there because their instruments can detect it deep in the Earth's crust. The thickest beds of tektites are found in this area.



The Yucatan Peninsula in Mexico, where scientists have found a massive meteorite crater.

GIGANTIC WAVES

In northern Mexico and in Texas, USA, scientists have found some strange rocks. They are made up of things usually found in the sea and some fossilized wood, all mixed up, swirled around and spread out as sediment. Some experts say that all this was left behind by the gigantic waves that swept across the land when a meteorite hit the Earth.

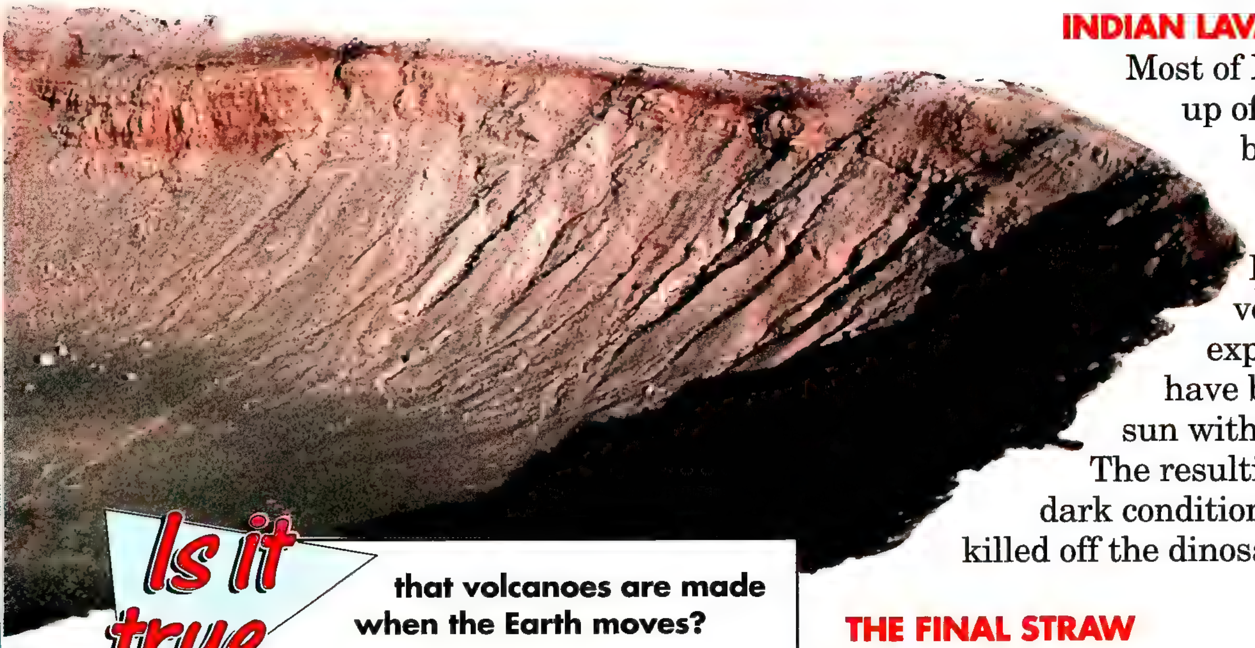
FOREST FIRES

In other parts of the world, including Denmark and New Zealand, the fossil wood in the top layer of Cretaceous rocks looks as if it has been burned. This may be because the intense heat of a meteorite's explosion caused massive forest fires.

DOES THAT PROVE IT?

The meteorite theory has convinced many scientists. But there are other theories. Some experts believe that all this evidence could also be explained by massive volcanic activity caused by the moving continents.

A *Tyrannosaurus rex* has died of starvation. It makes a tasty meal for some prehistoric rats.



INDIAN LAVA

Most of India is made up of lava produced by volcanoes during the Cretaceous Period. Massive volcanic explosions could have blocked out the sun with a layer of dust. The resulting cold and dark conditions could have killed off the dinosaurs.

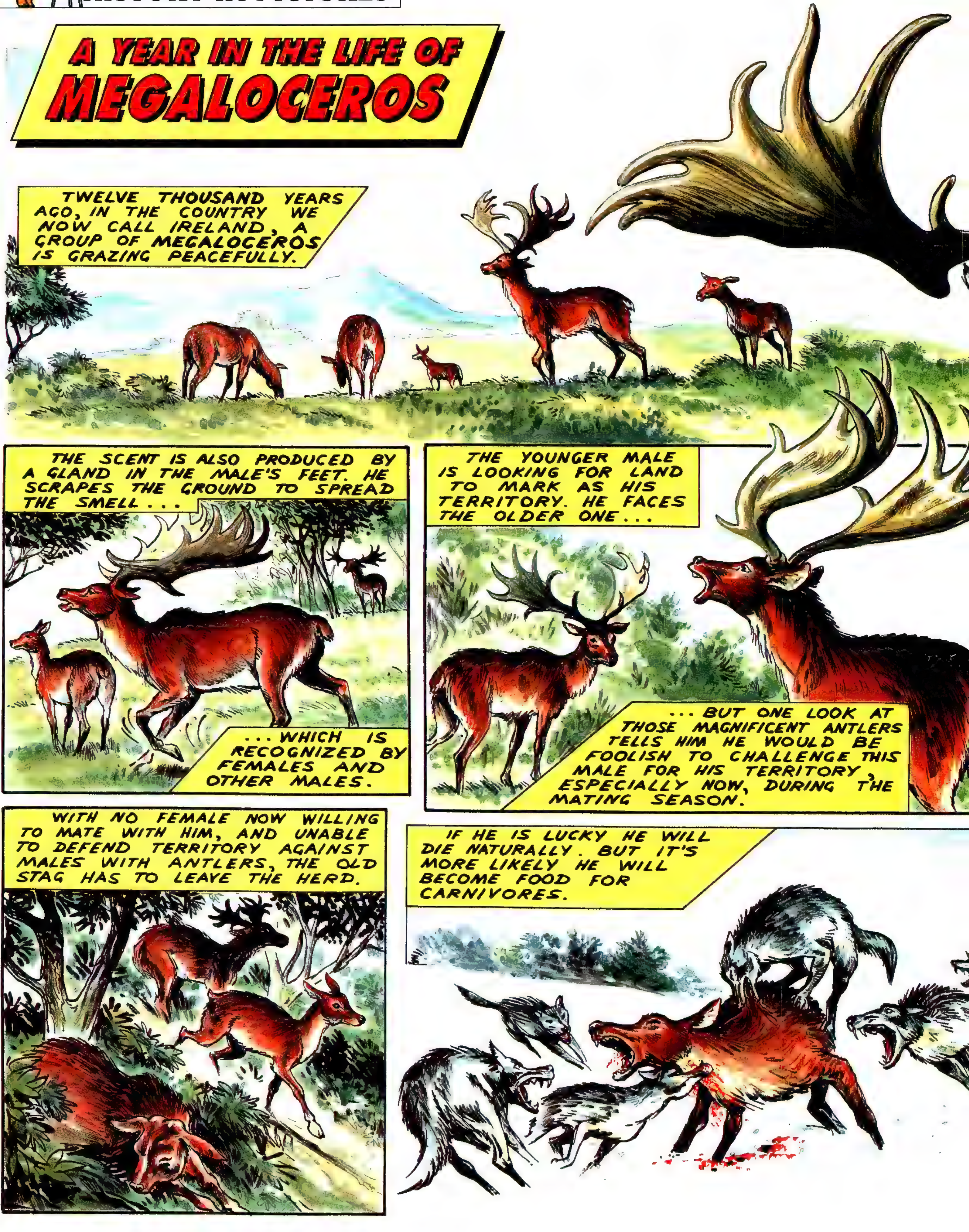
Is it true that volcanoes are made when the Earth moves?

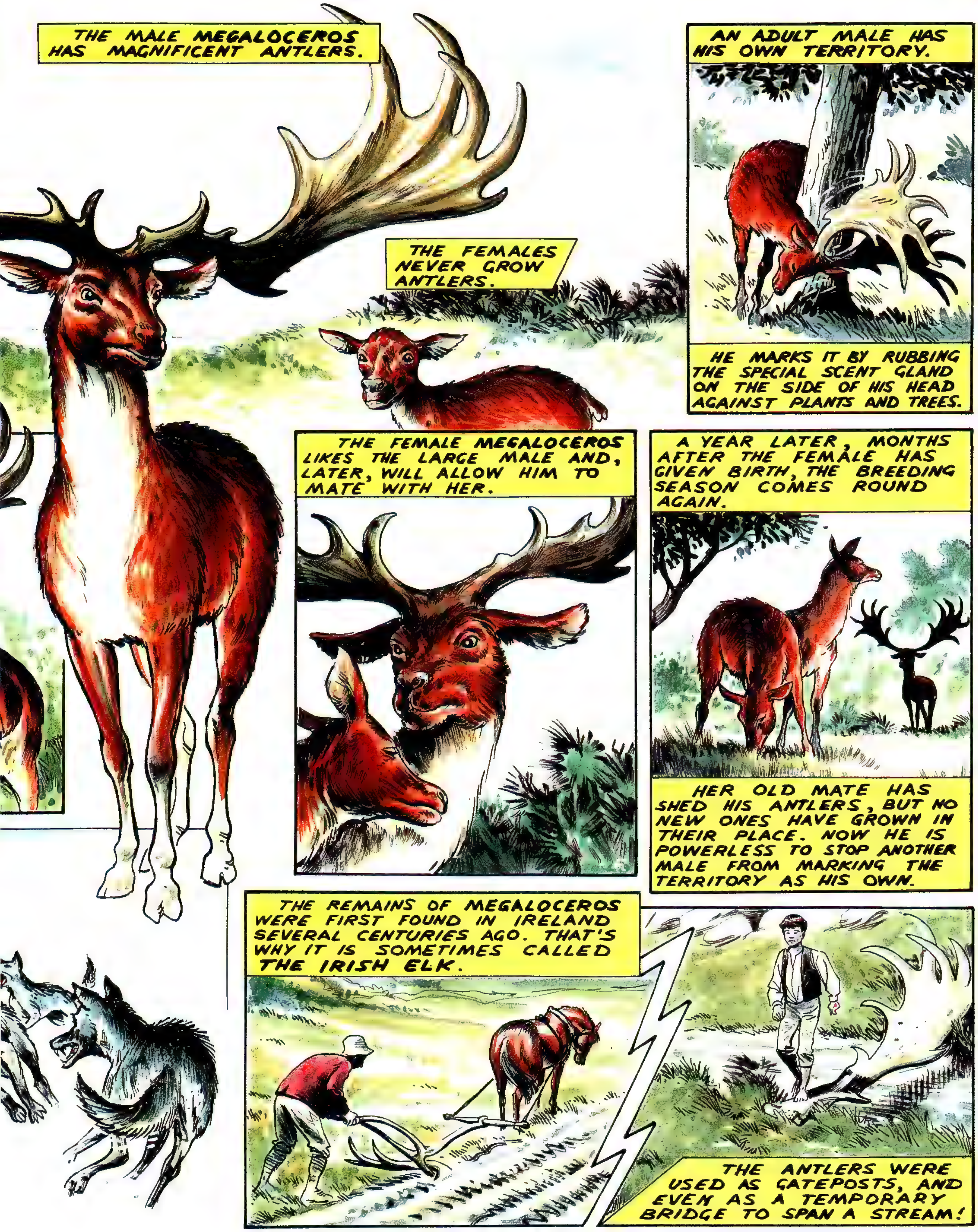
Yes. There are massive slabs of rock, known as 'plates', in the Earth's surface. When these slide around, hot, molten rock (magma) from deep underground is forced up to the surface. It spews out at the point where the plates meet and forms a volcano. When magma reaches the surface, it is called lava. When volcanoes erupt, lava can flow out and destroy whole towns.

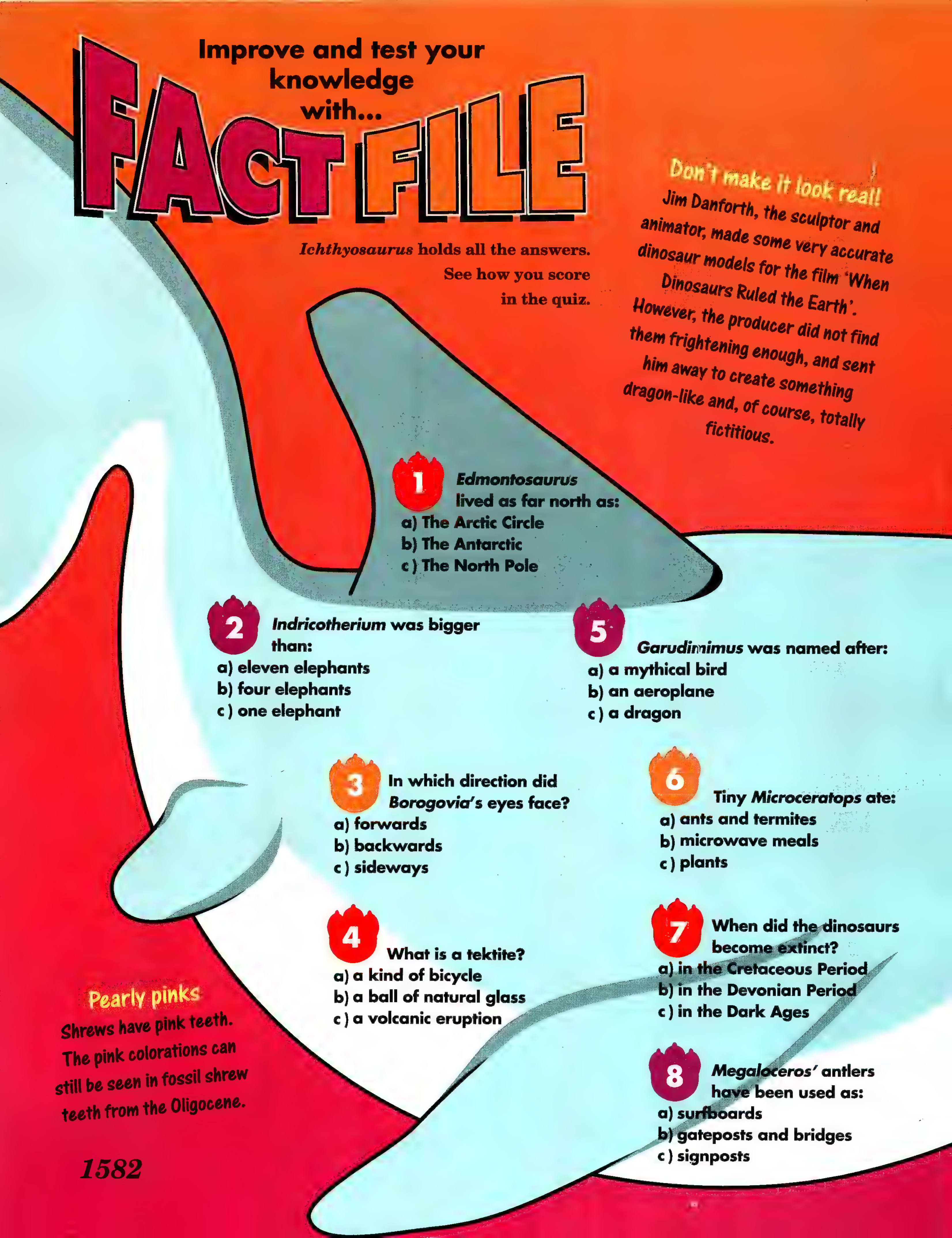
THE FINAL STRAW

Some scientists believe that the dinosaurs died out slowly as the Earth's climate changed to become much colder. An event such as a gigantic meteorite crashing into the Earth, or massive volcanic eruptions, may have been the disaster that finally pushed the weakened dinosaurs over the edge and into extinction.So perhaps both theories are right!

A YEAR IN THE LIFE OF MEGALOCEROS


TWELVE THOUSAND YEARS AGO, IN THE COUNTRY WE NOW CALL IRELAND, A GROUP OF MEGALOCEROS IS GRAZING PEACEFULLY.
THE SCENT IS ALSO PRODUCED BY A GLAND IN THE MALE'S FEET. HE SCRAPES THE GROUND TO SPREAD THE SMELL . . .
. . . WHICH IS RECOGNIZED BY FEMALES AND OTHER MALES.
THE YOUNGER MALE IS LOOKING FOR LAND TO MARK AS HIS TERRITORY. HE FACES THE OLDER ONE . . .
. . . BUT ONE LOOK AT THOSE MAGNIFICENT ANTLERS TELLS HIM HE WOULD BE FOOLISH TO CHALLENGE THIS MALE FOR HIS TERRITORY, ESPECIALLY NOW, DURING THE MATING SEASON.
WITH NO FEMALE NOW WILLING TO MATE WITH HIM, AND UNABLE TO DEFEND TERRITORY AGAINST MALES WITH ANTLERS, THE OLD STAG HAS TO LEAVE THE HERD.
IF HE IS LUCKY HE WILL DIE NATURALLY. BUT IT'S MORE LIKELY HE WILL BECOME FOOD FOR CARNIVORES.


THE MALE MEGALOCEROS HAS MAGNIFICENT ANTLERS.
THE FEMALES NEVER GROW ANTLERS.
AN ADULT MALE HAS HIS OWN TERRITORY.
HE MARKS IT BY RUBBING THE SPECIAL SCENT GLAND ON THE SIDE OF HIS HEAD AGAINST PLANTS AND TREES.
THE FEMALE MEGALOCEROS LIKES THE LARGE MALE AND, LATER, WILL ALLOW HIM TO MATE WITH HER.
A YEAR LATER, MONTHS AFTER THE FEMALE HAS GIVEN BIRTH, THE BREEDING SEASON COMES ROUND AGAIN.
HER OLD MATE HAS SHED HIS ANTLERS, BUT NO NEW ONES HAVE GROWN IN THEIR PLACE. NOW HE IS POWERLESS TO STOP ANOTHER MALE FROM MARKING THE TERRITORY AS HIS OWN.
THE REMAINS OF MEGALOCEROS WERE FIRST FOUND IN IRELAND SEVERAL CENTURIES AGO. THAT'S WHY IT IS SOMETIMES CALLED THE IRISH ELK.
THE ANTLERS WERE USED AS GATEPOSTS, AND EVEN AS A TEMPORARY BRIDGE TO SPAN A STREAM!



Improve and test your knowledge with...

FACT FILE

Ichthyosaurus holds all the answers. See how you score in the quiz.

Don't make it look real!

Jim Danforth, the sculptor and animator, made some very accurate dinosaur models for the film 'When Dinosaurs Ruled the Earth'. However, the producer did not find them frightening enough, and sent him away to create something dragon-like and, of course, totally fictitious.

1 ***Edmontosaurus*** **lived as far north as:**

a) The Arctic Circle
b) The Antarctic
c) The North Pole

2 ***Indricotherium*** **was bigger than:**

a) eleven elephants
b) four elephants
c) one elephant

3 **In which direction did *Borogovia*'s eyes face?**

a) forwards
b) backwards
c) sideways

4 **What is a tektite?**

a) a kind of bicycle
b) a ball of natural glass
c) a volcanic eruption

5 ***Garudimimus*** **was named after:**

a) a mythical bird
b) an aeroplane
c) a dragon

6 **Tiny *Microceratops* ate:**

a) ants and termites
b) microwave meals
c) plants

7 **When did the dinosaurs become extinct?**

a) in the Cretaceous Period
b) in the Devonian Period
c) in the Dark Ages

8 ***Megaloceros'*** **antlers have been used as:**

a) surfboards
b) gateposts and bridges
c) signposts

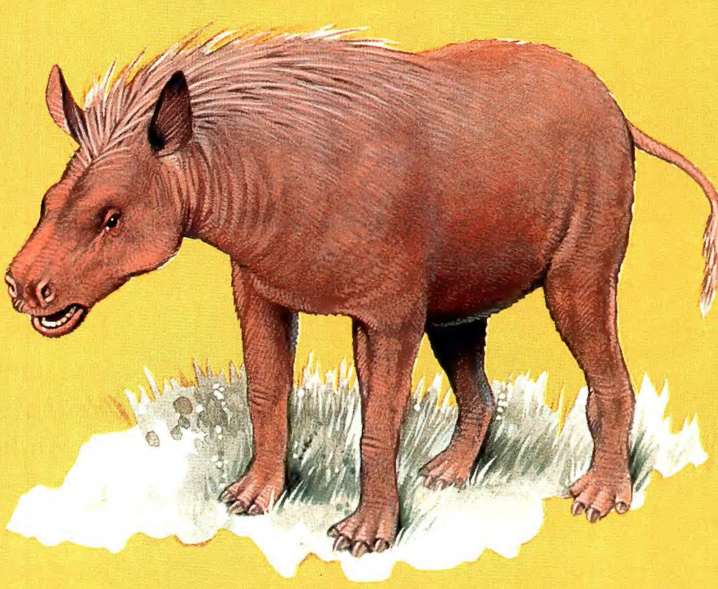
Pearly pinks

Shrews have pink teeth. The pink colorations can still be seen in fossil shrew teeth from the Oligocene.

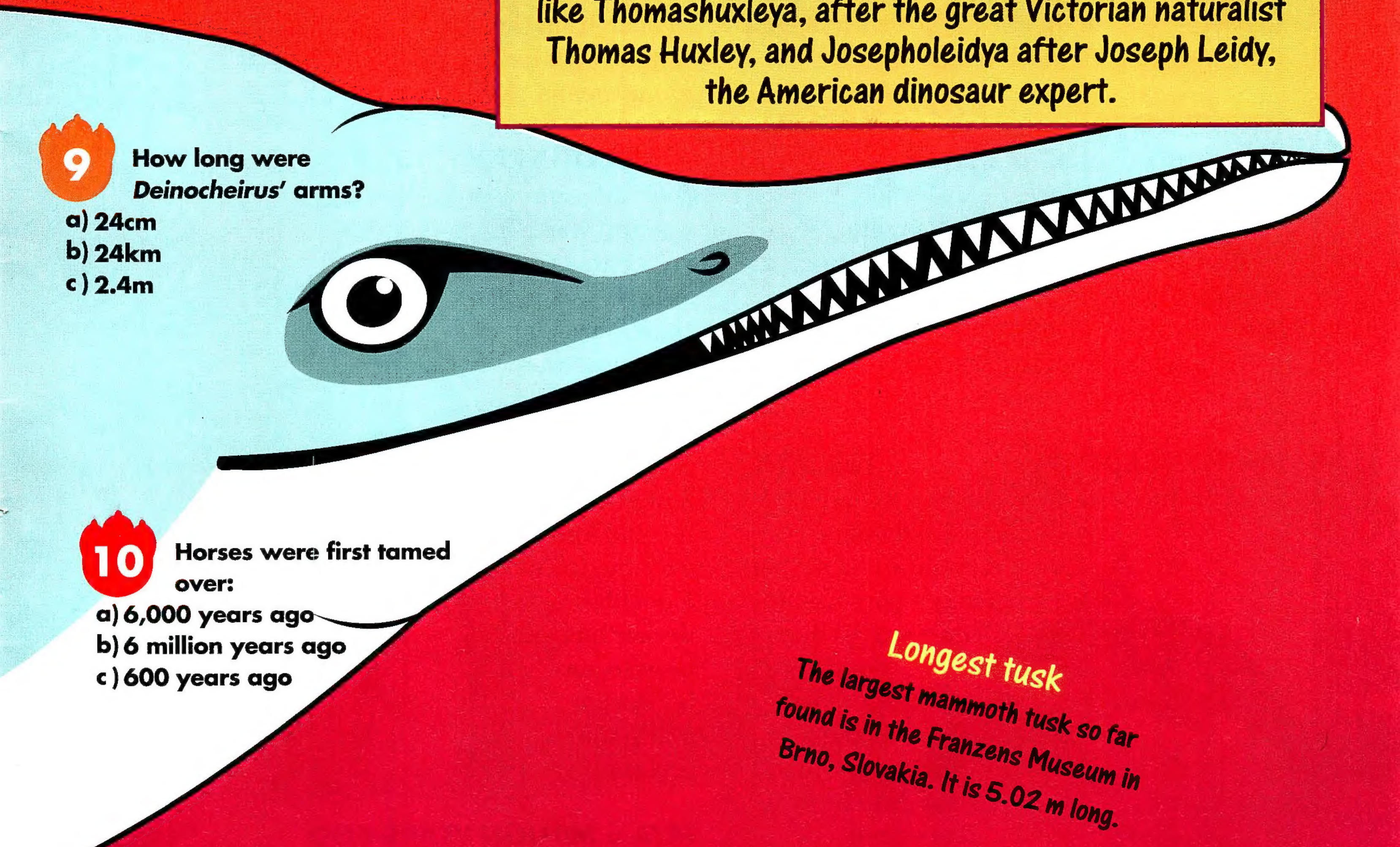
Dino dreams

Edward Drinker Cope, the famous 19th-century American dinosaur hunter, was so badly affected by the bad food and water on field trips that his sleep was broken by nightmares about being savaged by the very dinosaurs that his expedition was seeking.

Meet Thomashuxleya



Sometimes fossil animals are named after famous people. The Argentinian palaeontologist Florentino Ameghino took this to extremes, giving his finds names like Thomashuxleya, after the great Victorian naturalist Thomas Huxley, and Josepholeidya after Joseph Leidy, the American dinosaur expert.



9 **How long were *Deinocheirus'* arms?**
- a) 24cm
- b) 24km
- c) 2.4m

10 **Horses were first tamed over:**
- a) 6,000 years ago
- b) 6 million years ago
- c) 600 years ago

Longest tusk

The largest mammoth tusk so far found is in the Franzens Museum in Brno, Slovakia. It is 5.02 m long.

Answers to the questions on inside back cover

A to Z OF PREHISTORIC ANIMALS IC – IN

ICAROSAURUS 200 MYA

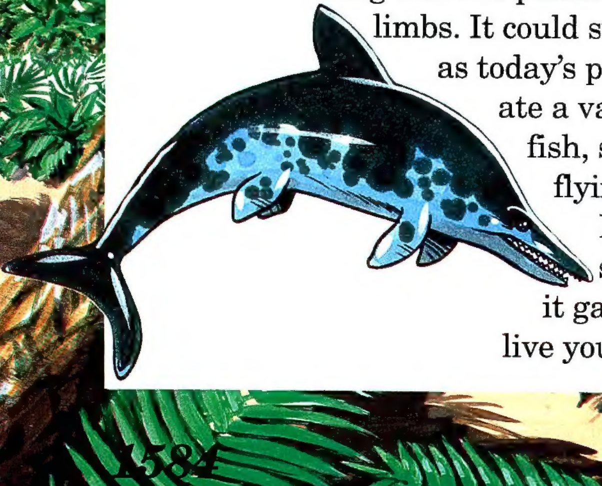
Icarosaurus (ik-ar-oh-saw-rus) lived in North America in the Late Triassic Period. It was a gliding lizard-like reptile. Its wings were actually ribs covered with skin. As it glided from tree to tree, *Icarosaurus* made its ribs swing forward so that they opened up like parachutes to help it make a smooth landing.

ICHTHYORNIS 80 MYA

Ichthyornis (ik-thee-or-nis) lived in Kansas, USA in the Late Cretaceous Period. It looked like a modern seagull. Unlike *Hesperornis*, the diving bird, *Ichthyornis* was probably able to fly. Its long narrow beak was lined with teeth for holding the fish it plucked from the sea. *Ichthyornis* means 'fish bird'.

ICHTHYOSAURUS 160 MYA

Ichthyosaurus (ik-thee-o-saw-rus) had a long tail and paddle-like limbs. It could swim as fast as today's porpoise. It ate a varied diet of fish, squid and flying reptiles. Fossils show that it gave birth to live young.

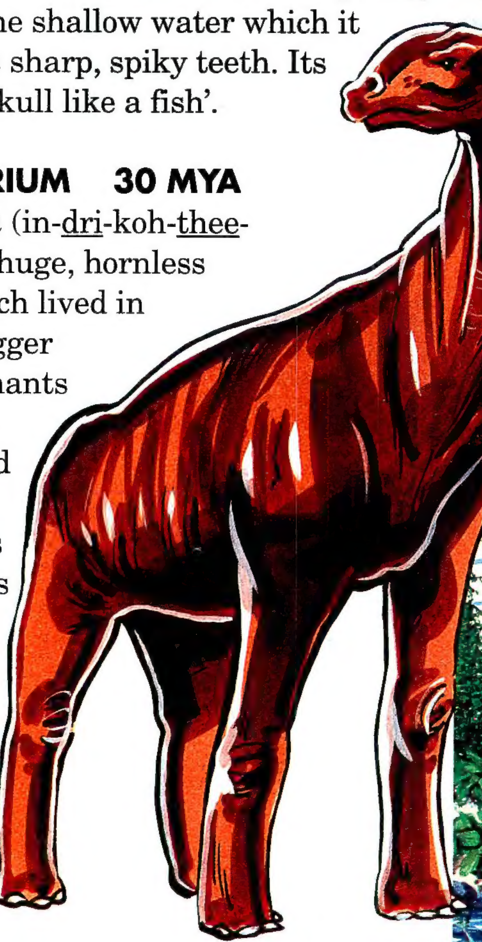


ICHTHYOSTEGA 340 MYA

In Late Devonian times, Greenland was much warmer than it is today. It was the home of *Ichthyostega* (ik-thee-o-stee-ga), the first amphibian. It was also one of the oldest land vertebrates (animals with backbones) and the ancestor of mammals, birds and reptiles. As long as a turtle, *Ichthyostega* had some fish-like features such as scales, a broad fin at the end of its tail and a tapered head. But it also walked slowly on four well-developed legs, which had evolved from fish fins. *Ichthyostega* ate fish from the shallow water which it caught with its sharp, spiky teeth. Its name means 'skull like a fish'.

INDRICOTHERIUM 30 MYA

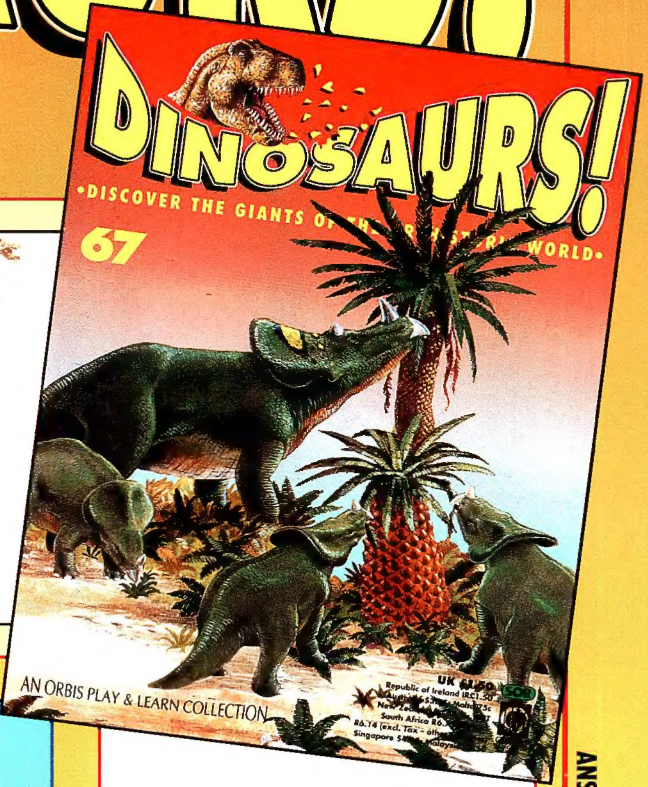
Indricotherium (in-dri-koh-thee-ree-um) was a huge, hornless rhinoceros which lived in Asia. It was bigger than four elephants today and was the largest land animal ever. Standing on its four sturdy legs it could look over the top of a double-decker bus and browse on leaves 8m above the ground.



MYA = MILLION YEARS AGO

COMING IN PART 67 OF

DINOSAURS!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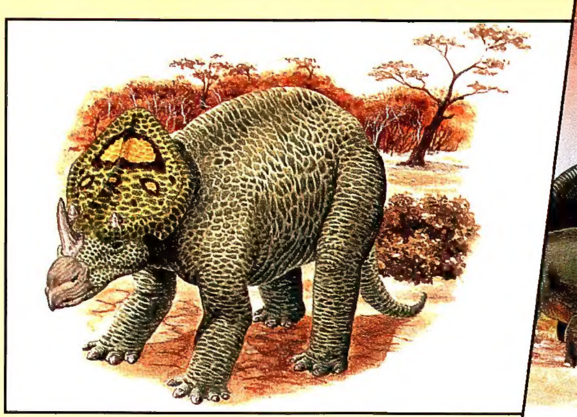
Find out what dinosaurs would look like if they were still alive in TIME DETECTIVE. Ancient whales feature in PREHISTORIC WORLD.



PLUS

Three fascinating creatures in IDENTIKIT and HISTORY IN PICTURES 3-D GALLERY GIANTS OF THE PAST

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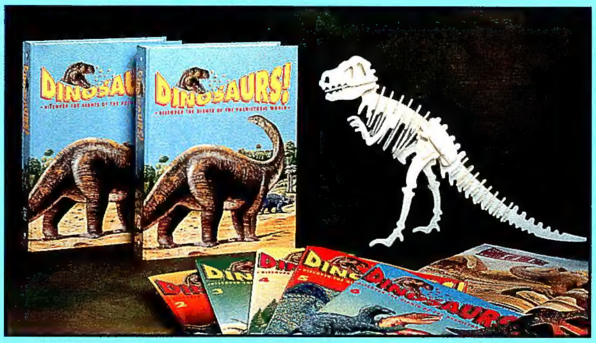

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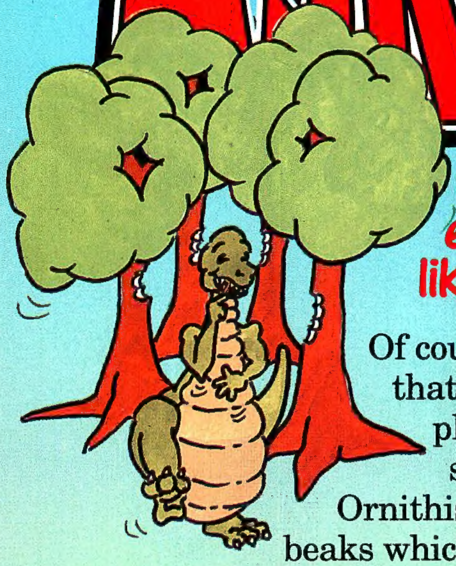
ANSWERS TO FACT FILE QUESTIONS: 1.a 2.b 3.a 4.b 5.a 6.c 7.a 8.b 9.c 10.a

Dr David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

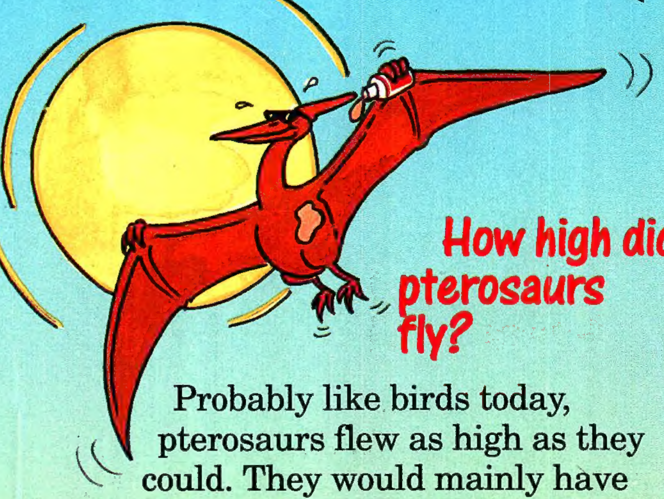


Could dinosaurs eat tree bark, like today's deer?

Of course, it is possible that some of the plant-eaters ate, or scraped, tree bark. Ornithischians had sharp beaks which would probably have been capable of scraping bark. Naturally, if they did this it would have killed the tree. Unfortunately, we do not have fossil evidence to support this idea.

Land animals evolved from sea animals, so why did some, such as plesiosaurs, go back to the sea?

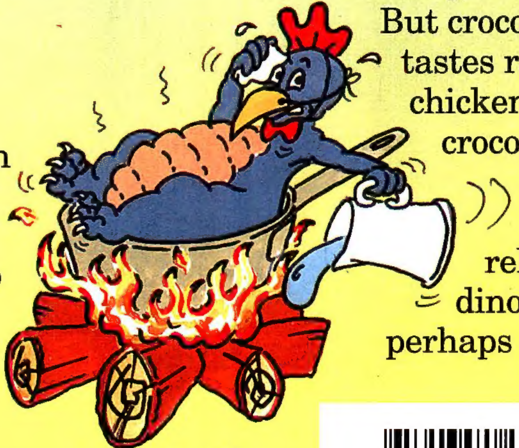
Land animals developed a number of features that are also useful for life in the sea. They developed tough, waterproof skin, strong legs and air-breathing lungs. Waterproof skin insulates an animal's body against the effects of water which can be troublesome to animals with leaky skins. Legs are useful as strong paddles for swimming. Lungs enable the animal to breathe air, removing the need for leaky gills. Lungs also provide an inbuilt buoyancy tank which helps the animal to float. Many land animals, such as penguins, whales and seals, as well as the marine reptiles, have used these features to re-invade the water.



How high did pterosaurs fly?

Probably like birds today, pterosaurs flew as high as they could. They would mainly have been limited by the availability of oxygen. Above about 4,500m the air is rather thin because it contains less oxygen, so this may well have been the upper limit for most pterosaurs.

Do you know what dinosaur meat would have tasted like?



Frankly, I have no idea. But crocodile meat tastes rather like chicken, and since crocodiles and birds are the nearest relatives of dinosaurs, perhaps dinosaur meat was a bit like chicken.

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